

Lectures: MWF 12:30–1:20
More 116

Instructor: John M. Lee
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Office Hours: Mon & Fri 10:30–11:30 or by appointment

Course Web site: <http://www.math.washington.edu/~lee/Courses/443-2003>
(or from the Math Department home page,
Selected Course Web Pages → Math 443A)

Required Textbook:

[dC] Manfredo P. do Carmo, *Differential Geometry of Curves and Surfaces*, Prentice-Hall, 1976.

Supplementary Books:

(On reserve in the Math Research Library, PDL C-306. The first three are also on reserve in Odegaard.)

- [S] J. Stewart, *Calculus: Early Transcendentals*, Brooks/Cole, 1999
- [JRA] L. W. Johnson, R. D. Riess, and J. T. Arnold, *Introduction to Linear Algebra*, 5th ed., Addison-Wesley, 2002
- [TM] A. E. Taylor and W. R. Mann, *Advanced Calculus*, 3rd ed., Wiley, 1983
- [G] A. Gray, *Modern differential geometry of curves and surfaces*, CRC Press, 1993
- [K] W. Kühnel, *Differential geometry: curves–surfaces–manifolds*, American Math. Soc., 2002
- [MP] R. S. Millman and G. D. Parker, *Elements of differential geometry*, Prentice-Hall, 1977.

Class Description:

This course is a continuation of Math 442, *Differential Geometry*. In this quarter, we will focus mainly on the intrinsic and global properties of surfaces (Chapters 4 and 5 of do Carmo). A property of a surface is “intrinsic” if it is preserved by isometries, that is, by maps from one surface to another that take the first fundamental form of one to the first fundamental form of the other. A property is “global” if it depends on the topology of the whole surface, not just on the local geometry near a point. The most important intrinsic invariant is the Gaussian curvature, and the most important global result is the Gauss-Bonnet theorem, which relates the Gaussian curvature of a compact surface to its topology.

Prerequisites:

Math 442. Because this course continues where Math 442 left off, you will need to have a solid understanding of all the material covered in Math 442 (Chapters 1–3 of do Carmo).

Homework:

A homework assignment will be given out each week. Usually, each assignment will be handed out on a Monday and will be due the following Monday. When Monday is a UW holiday, the assignment will be handed out or due the following Wednesday. Graded assignments will usually be returned by Friday of the same week, along with written solutions to selected problems.

The homework will be structured just as in Math 442: Reading, Practice Problems, and Required Problems. Only the required problems need to be written up and handed in.

I encourage you to form study groups and work together on the homework problems (it's usually the best and fastest way to learn). However, when you write up your solutions to hand in, *you must write your own solutions in your own words.*

Here are some other important instructions regarding homework:

- Please staple your homework papers together, with the required problems in numerical order, and with your name and student number on every page. Write legibly, in complete sentences, and leave ample margins in which the grader can write comments.
- Each of the “Required Problems” will be graded. Selected problems will be graded on a scale of 0 to 10 points, and the remaining ones will be graded on a scale of 0 to 2. The 10-point problems will be graded in detail, with partial credit given for incomplete solutions. The 2-point problems will be given 0 points if there is no reasonable attempt at a solution, 1 point if you make a reasonable attempt, and 2 points if there are no blatant mistakes. Since you won't know in advance which problems will be graded for 10 points, it pays to try to answer all problems as thoroughly as possible.
- In computing your final grade, your raw homework scores will be converted to percentages, so that each assignment carries equal weight. Then your lowest homework score will be dropped, and the remaining assignments will be averaged.

Exams:

- **Midterm: Monday, May 5, 12:30–1:20pm, More 116.**
- **Final: Thursday, Jun. 12, 8:30–10:20am, More 116.**

During each exam, you may use two $8\frac{1}{2}'' \times 11''$ one-sided pages (or one sheet written on both sides) of your own handwritten notes. No photocopied or printed material is allowed. You may not share notes with other students.

Grading:

Your grade will be based on homework (30%), the midterm (30%), and the final exam (40%). If your final exam grade is higher than your midterm grade, then your final exam grade will replace your midterm grade, so in that case your final exam will be worth 70% of your grade.